

# GCSE

# Physical Education

8582/1 - Paper 1- The Human Body and Movement in Physical Activity and Sport

Mark scheme

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8582

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Version/Stage: 1.0 Final

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Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this mark scheme are available from [aqa.org.uk](http://aqa.org.uk)

## Level of response marking instructions

Level of response mark schemes are broken down into levels, each of which has a descriptor. The descriptor for the level shows the average performance for the level. There are marks in each level.

Before you apply the mark scheme to a student's answer read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can then apply the mark scheme.

### Step 1 Determine a level

Start at the lowest level of the mark scheme and use it as a ladder to see whether the answer meets the descriptor for that level. The descriptor for the level indicates the different qualities that might be seen in the student's answer for that level. If it meets the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptor and the answer. With practice and familiarity you will find that for better answers you will be able to quickly skip through the lower levels of the mark scheme.

When assigning a level you should look at the overall quality of the answer and not look to pick holes in small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best fit approach for defining the level and then use the variability of the response to help decide the mark within the level, i.e. if the response is predominantly level 3 with a small amount of level 4 material it would be placed in level 3 but be awarded a mark near the top of the level because of the level 4 content.

### Step 2 Determine a mark

Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this. The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which will correspond with each level of the mark scheme. This answer will have been awarded a mark by the Lead Examiner. You can compare the student's answer with the example to determine if it is the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the Lead Examiner's mark on the example.

You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do not have to cover all of the points mentioned in the Indicative content to reach the highest level of the mark scheme.

An answer which contains nothing of relevance to the question must be awarded no marks.

0 1

Which **one** of these is the most appropriate test to measure maximal strength?

[1 mark]

**Marks for this question: AO1 = 1**

**C – The One Rep Max Test**

0 2

Which one of these lung volumes is defined as ‘the amount of air left in the lungs after a maximal exhalation’?

[1 mark]

**Marks for this question: AO1 = 1**

**C – Residual Volume**

0 3

Which **one** of these muscles is found at the shoulder joint?

[1 mark]

**Marks for this question: AO1 = 1**

**A – Deltoid**

0 4

Which **one** of these bones is located at the ankle joint?

[1 mark]

**Marks for this question: AO1 = 1**

**D – Talus**

0 5

Which **one** of these best describes coordination?

[1 mark]

**Marks for this question: AO1 = 1**

**C – To move two or more body parts together smoothly**

<b>0 6</b>	Which <b>one</b> of these is a long term benefit of exercise?	<b>[1 mark]</b>
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**Marks for this question: AO1 = 1**

**B – Reduced blood pressure**

<b>0 7</b>	Which <b>one</b> of these are suitable methods of collecting qualitative data?	<b>[1 mark]</b>
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**Marks for this question: AO1 = 1**

**A – Interviews and observations**

<b>0 8</b>	<b>Figure 1</b> shows a photograph of Usain Bolt driving away from the starting blocks in a 200m race.	
<b>0 8</b>	. <b>1</b> Using <b>Figure 1</b> , identify the joint movements at the hip and ankle of Usain Bolt's driving leg.	<b>[2 marks]</b>

**Marks for this question: AO2 = 2**

Award **one** mark for each of the following points up to a maximum of **two** marks.

Hip – Extension (1)

Ankle – Plantar flexion (1)

**Maximum 2 marks**

<b>0 8</b>	. <b>2</b> Using <b>Figure 1</b> , identify the main agonist at the knee and ankle of Usain Bolt's driving leg.	<b>[2 marks]</b>
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**Marks for this question: AO2 = 2**

Award **one** mark for each of the following points up to a maximum of **two** marks.

Knee: Quadriceps (1)

Ankle: Gastrocnemius (1)

**Maximum 2 marks**

<b>0</b>	<b>9</b>	<p>When a performer exercises, blood is redistributed to different parts of the body.</p> <p>Explain <b>two</b> ways in which the body redistributes blood during exercise.</p> <p style="text-align: right;"><b>[4 marks]</b></p>
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**Marks for this question: AO1 = 2, AO2 = 2**

Award **one** mark for each of the following points up to a maximum of **four** marks. Award up to a maximum of **two** AO1 marks and up to a maximum of **two** AO2 marks.

**AO1 (sub-max 2 marks)**

- Vasoconstriction (1)
- Vasodilation (1)

**AO2 (sub-max 2 marks)**

- Vasoconstriction – arterioles feeding the areas not needing so much blood become smaller, restricting blood flow to those tissues that are not needed during exercise (1)
- Vasodilation – arterioles feeding the areas needing more blood (muscles, skin or heart) become wider, increasing blood flow / to move tissues that are needed during exercise (1)

**NB** For AO2, only award a mark for responses that refer to both the changing life of a blood vessel and area of redistribution.

**Maximum 4 marks**

<b>1</b>	<b>0</b>	<p><b>Figure 2</b> shows a diagram of the knee joint.</p>
<b>1</b>	<b>0</b>	<p>Identify structures <b>A</b> and <b>B</b> from <b>Figure 2</b>.</p> <p style="text-align: right;"><b>[2 marks]</b></p>

**Marks for this question: AO1 = 2**

Award **one** mark for each of the following points up to a maximum of **two** marks.

- A – Cartilage (1)
- B – Synovial fluid (1)

**Maximum 2 marks**

1	0	.	2	For <b>one</b> of the structures identified in question <b>10.1</b> , describe its function in the prevention of injury.	<b>[2 marks]</b>
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**Marks for this question: AO1 = 2**

Award **one** mark for each of the following points up to a maximum of **two** marks.

Cartilage:

- It absorbs shock and acts as a buffer between the bones (1)
- Prevents bones rubbing together reducing friction (1)

Synovial fluid:

- Lubricates the joint (1)
- Prevents bones rubbing together reducing friction / allow joint to run smoothly (1)

Accept any other suitable function of the structures of the knee joint highlighted in **10.1**. Answers must be related to the prevention of injury.

**Maximum 2 marks**

<b>1</b>	<b>1</b>	<p>Following a period of intensive exercise, Rosie is experiencing excess post-exercise oxygen consumption (EPOC).</p> <p>State what happens to Rosie’s breathing immediately after intensive exercise. Explain the reasons why her breathing is like this.</p> <p style="text-align: right;"><b>[4 marks]</b></p>
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**Marks for this question: AO1 = 1, AO2 = 3**

Award **one** mark for each point up to a maximum of **four** marks. Award up to a maximum of **one** AO1 marks and up to a maximum of **three** AO2 marks.

**AO1 (sub-max 1 mark)**

- Continue to breathe deeply / quickly (1)
- Maintain increased breathing rate (1)

**NB** Do not credit increased breathing rate on its own.

**AO2 (sub-max 3 marks)**

- The period of intensive exercise will have been anaerobic (1)
- To allow oxygen stores to be replenished / to repay the oxygen debt (1)
- To remove lactic acid from the body (1)

Accept any other explanation of why Rosie’s breathing is deep. Answers must be related to EPOC and Rosie’s intensive exercise.

**Maximum 4 marks**



<b>1</b>	<b>2</b>	.	<b>1</b>	Define concentric contraction.	
Use a sporting example in your answer.					
					<b>[2 marks]</b>

**Marks for this question: AO1 = 1, AO2 = 1**

Award **one** mark for the definition and **one** further mark for an example.

**AO1 (sub-max 1 mark)**

- Concentric contraction – when a muscle shortens (1)

**AO2 (sub-max 1 mark)**

- Upward phase of a bicep curl (1)
- When running to allow flexion at the knee (1)
- Preparation phase of shot putt (1)

Accept any other suitable definition of concentric contraction. Sporting examples must relate to where concentric contraction occurs. Only one example can be credited.

NB If the definition is incorrect, no mark can be awarded for the example.

**Maximum 2 marks**

<b>1</b>	<b>2</b>	.	<b>2</b>	Define isometric contraction.	
Use a sporting example in your answer.					
					<b>[2 marks]</b>

**Marks for this question: AO1 = 1, AO2 = 1**

Award **one** mark for the definition and **one** further mark for an example.

**AO1 (sub-max 1 mark)**

- Isometric contraction - Where the length of the muscle does not alter. The contraction is constant, ie pushing against a load or where the muscle does not shorten or lengthen (1)

**AO2 (sub-max 1 mark)**

- Plank (1)
- Handstand (1)
- Pushing in a scrum (1)
- Crucifix (1)

Accept any other suitable definition of isometric contraction. Sporting examples must relate to where isometric contraction occurs in that sport. Only one example can be credited.

NB If the definition is incorrect, no mark can be awarded for the example.

**Maximum 2 marks**

1   3	State <b>two</b> short-term effects of exercise (24 to 36 hours after exercise).	<b>[2 marks]</b>
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**Marks for this question: AO1 = 2**

Award **one** mark for each of the following marks up to a maximum of **two** marks.

**AO1**

- Tiredness / fatigue (1)
- Nausea (1)
- Aching / delayed onset of muscle soreness / DOMS / cramp (1)
- Light headedness (1)

Accept any other suitable short-term effect of exercise (24 to 36 hours after exercise).

**Maximum 2 marks**

1   4	Fitness testing is becoming increasingly important in sports preparation and performance.  Identify <b>two</b> limitations of fitness testing.	<b>[2 marks]</b>
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**Marks for this question: AO1 = 2**

Award **one** mark for each of the following points up to a maximum of **two** marks.

**AO1**

- Are they valid or reliable (1)
- Are they sports specific (1)
- Do they replicate the same movements or muscles required in chosen sport (1)
- Do they replicate competition conditions (1)
- There can be operative errors, eg sprint test by stopwatch (1)
- Some tests results are predictive and results are from norm tables and therefore not necessarily accurate, eg Harvard step test (1)
- Motivation can have a major impact on the scores (1)

Accept any other suitable limitation of fitness testing.

**Maximum 2 marks**

<b>1</b>	<b>5</b>	Justify why balance is an important component of fitness to a netball or basketball player.	<b>[4 marks]</b>
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**Marks for this question: AO2 = 1, AO3 = 3**

Award **one** mark for each of the following points up to a maximum of **four** marks.

**AO2 (sub-max 1 mark)**

- Required to keep a stable posture / to ensure that control of the body is maintained. (1)

**AO3 (sub-max 3 marks)**

- When marking, good balance would prevent contacting or obstructing the opposition (1)
- Stable position to avoid committing a foul due to incorrect footwork or travelling (1)
- When shooting, good balance would allow the shot to be more accurate and more likely to score (1)
- If pivoting or passing off one foot, footwork and passes would be more accurate (1)
- When transferring weight to either defend, dribble or get into a better position (1)
- When jumping to receive the ball or rebounding balance would be important when landing so that you do not fall over (1)

Accept any other suitable justification of why balance is an important component of fitness. Answers must refer to a netball player or a basketball player.

**Maximum 4 marks**

<b>1</b>	<b>6</b>	<b>. 1</b>	Give an example from the skeleton of where a hinge joint can be found.	<b>[1 mark]</b>
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**Marks for this question: AO1 = 1**

Award **one** mark for each of the following points up to a maximum of **one** mark.

- Elbow (1)
- Knee (1)
- Ankle (1)

**Maximum 1 mark**

**1 6 . 2** Give an example from the skeleton of where a ball and socket joint can be found. **[1 mark]**

**Marks for this question: AO1 = 1**

Award **one** mark for each of the following points up to a maximum of **one** mark.

- Hip (1)
- Shoulder (1)

**Maximum 1 mark**

**1 6 . 3** Define rotation.  
Use a sporting example in your answer. **[2 marks]**

**Marks for this question: AO1 = 1, AO2 = 1**

Award **one** mark for defining rotation and **one** mark for an example from a sporting action.

**AO1 (sub-max 1 mark)**

Rotation

- A circular movement where part of the body turns whilst the rest remains still. (1)
- A movement around an axis (1)
- Turning a limb along its axis (1)

**AO2 (sub-max 1 mark)**

- Arm action when bowling in cricket (1)
- Arm action in freestyle swimming. (1)
- A somersault in gymnastics (1)

Accept any other suitable definition of rotation. Sporting examples must relate to where rotation occurs with the performer in that sport. Only one example can be credited.

**Maximum 2 marks**

1 6 . 4

Define abduction.

Use a sporting example in your answer.

[2 marks]

**Marks for this question: AO1 = 1, AO2 = 1**

Award **one** mark for defining abduction and **one** mark for an example from a sporting action.

**AO1 (sub-max 1 mark)**

- Abduction - movement of the bone or limb from the midline of the body. (1)

**AO2 (sub-max 1 mark)**

- Performing the pull phase in the breaststroke (1)
- Extending an arm sideways when stretching to catch a ball. (1)

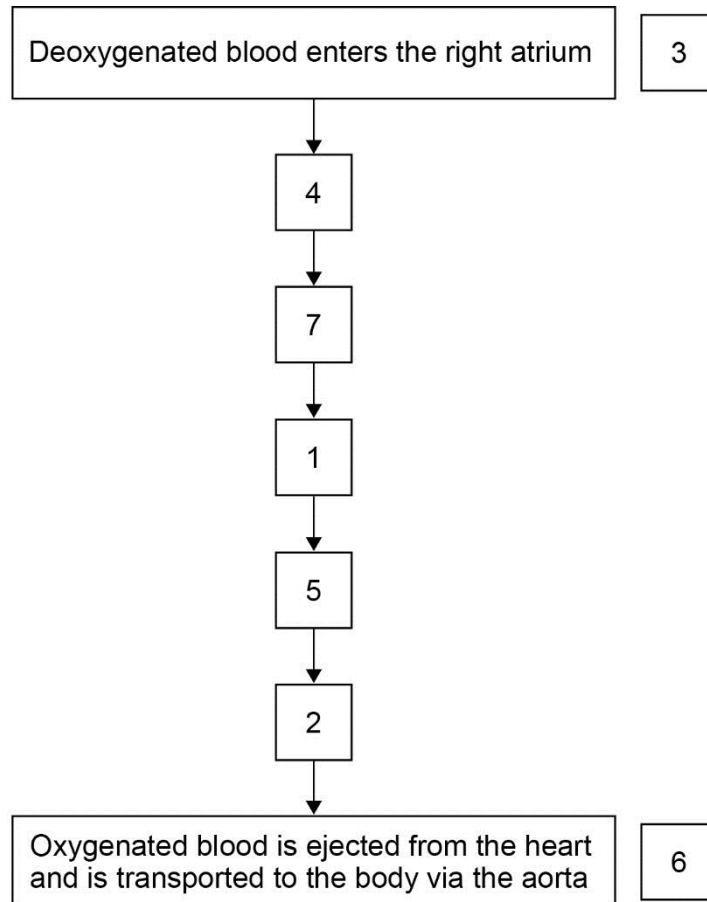
Accept any other suitable definition of abduction. Sporting examples must relate to where abduction occurs with the performer in that sport. Only one example can be credited.

**Maximum 2 marks**

<b>1</b>	<b>7</b>	Complete <b>Figure 3</b> to show the pathway of blood through the heart during the cardiac cycle.	<b>[5 marks]</b>
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**Marks for this question: AO1 = 5**

Award **one** mark for correct placement of positions 2-6, up to a maximum of **five** marks.



**NB** Credit each correctly placed answer. Do not credit correctly placed first and last positions (3 and 6) as these were given in the question.

**Maximum 5 marks**

<b>1</b>	<b>8</b>	Justify why reaction time is important for a cricketer.	<b>[3 marks]</b>
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**Marks for this question: AO3 = 3**

Award **one** mark for each of the following points up to a maximum of **three** marks.

**AO3**

- The ball may be travelling fast so the batsman will need to react quickly to stimulus / ball and initiate a response, otherwise the ball will beat the bat (1)
- The ball may deviate / spin off the pitch so the batsman must react to any lateral movement quickly to avoid getting out (1)
- If catching a hard hit shot, a close fielder has to respond quickly to attempt to stop or catch the ball (1)
- A wicket keeper has to respond quickly to a nick off the bat to make a catch (1)

Accept any other suitable justifications as to why reaction time is important for a cricketer. Answers must relate to specific examples from cricket.

**Maximum 3 marks**

<b>1</b>	<b>9</b>	<b>Figure 4</b> is a diagram of a forehand tennis stroke.	
<b>1</b>	<b>9</b>	. <b>1</b> Identify the plane and the axis when the arm bends at the elbow.	<b>[2 marks]</b>

**Marks for this question: AO2 = 2**

Award **one** mark for each of the following up to a maximum of **two** marks.

**AO2**

- Sagittal plane (1)
- Transverse axis (1)

**Maximum 2 marks**



**1 9 . 2** Identify the type of lever being used at the elbow during the forehand tennis stroke. **[1 mark]**

**Marks for this question: AO1 = 1**

Award **one** mark for identifying the type of lever up to the maximum of **one** mark.

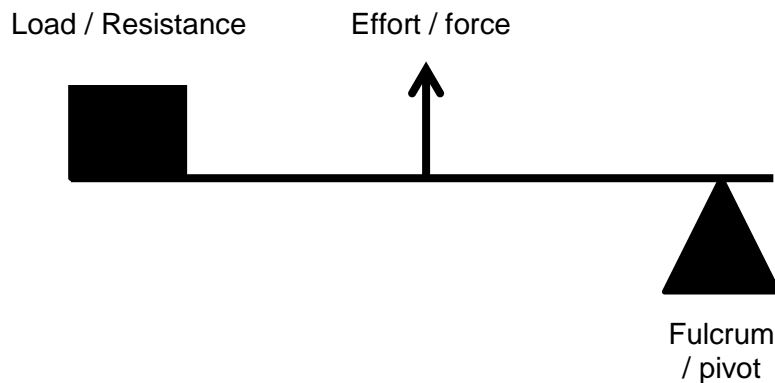
- Third class lever (1)

**Maximum 1 mark**

**1 9 . 3** Draw a fully labelled diagram to show this type of lever. **[2 marks]**

**Marks for this question: AO2 = 2**

Award **two** marks for drawing and fully labelling a third class lever up to a maximum of **two** marks.



- Correct order of lever system, ie resistance / load, effort / force and fulcrum / pivot (1)
- Correct drawing of lever system (1)

Accept the lever system being drawn the other way round.

**Maximum 2 marks**

**2 0**

Circuit training is a popular method of training for games players.

Discuss whether circuit training is an effective type of training for games players.

**[5 marks]**

**Marks for this question: AO3 = 5**

Award **one** mark for each of the following points up to a maximum of **five** marks.

**For (sub-max 3 marks)**

- Circuit training can be tailored to train the whole body as it can be used to train specific muscle groups which are necessary to perform effectively in all games (1)
- Circuit training can use different intensities to train both the aerobic and anaerobic energy systems, both of which might be used by a games player when sprinting for the ball or when jogging back into position when a goal is scored (1)
- Circuit training can be used to train a range of components of fitness which can be related to particular sports e.g speed for sprinting in a fast counter attack (1)
- Circuit training can be used to replicate situations or skills in a game such as sprinting, dodge, jump, etc (1)
- Circuit training can be used by large groups and is easily set up, therefore can accommodate team training sessions (1)
- Circuit training generally can be undertaken with little equipment, therefore is inexpensive which makes it accessible to all games players (1)

**Against (sub-max 3 marks)**

- Circuit training is not totally sports specific as they tend to be isolated exercises (1)
- Circuit training does not replicate 'real time' match situations as no opposition are present during training (1)
- Technique can be affected by fatigue when performing too many repetitions which can increase the risk of injury which can be detrimental to team and individual performances (1)

Accept any other suitable discursive point around the effectiveness of circuit training. Answers must be linked to games players.

NB A comparison with another type of training, which may be more appropriate for a games player, can be credited.

**Maximum 5 marks**

<b>2</b>	<b>1</b>	Two female students completed the Multi Stage Fitness Test as part of their GCSE lesson. The following results were recorded.
		Hannah who is 15 years old scored 5/7
		Saskia who is 16 years old scored 9/9
		<b>Table 1</b> shows the normative data for females for the Multi Stage Fitness Test.
<b>2</b>	<b>1</b>	Analyse the data in <b>Table 1</b> . What does it show about Hannah and Saskia's levels of cardiovascular fitness?
	<b>1</b>	

**[2 marks]**

**Marks for this question: AO2 = 2**

Award up to **two** marks for identifying Hannah's and Saskia's levels of cardiovascular fitness.

- Hannah's score indicates that she has a fair level of cardiovascular fitness (1)
- Saskia's score indicates that she has a very good level of cardiovascular fitness (1)

**Maximum 2 marks**

<b>2</b>	<b>1</b>	<b>.</b>	<b>2</b>	Explain why the score for the Multi Stage Fitness Test is quantitative data.
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**[2 marks]**

**Marks for this question: AO2 = 2**

Award up to **two** marks for explaining why the scores for the Multi Stage Fitness Test are quantitative.

- The measurements are objective, eg score gained on the MSF test (1)
- There is no expressed opinion, they are facts (1)

Accept any other suitable explanation as to why the score for the Multi Stage Fitness Test is quantitative data.

**Maximum 2 marks**

<b>2</b>	<b>2</b>	<p>In preparation for an important event, a marathon runner may train at altitude.</p> <p>Evaluate the effectiveness of altitude training as a way to improve the performance of a marathon runner.</p> <p style="text-align: right;"><b>[6 marks]</b></p>
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**Marks for this question: AO1 = 1, AO2 = 2, AO3 = 3**

Level	Marks	Description
3	5-6	Knowledge of altitude training is accurate and generally well detailed. Application to a marathon runner is mostly clear and effective. Evaluation is thorough, reaching valid and well-reasoned conclusions as to the effectiveness of altitude training in improving performance. The answer is generally clear, coherent and focused, with appropriate use of terminology throughout.
2	3-4	Knowledge of altitude training is evident. There is some appropriate and effective application to a marathon runner, although not always balanced and presented with clarity. Any evaluation is clear but the links to the effectiveness in improving the performance of a marathon runner is not always balanced or well-reasoned. The answer lacks coherence in places, although terminology is used appropriately on occasions.
1	1-2	Knowledge of altitude training is limited. Application to a marathon runner is either absent or inappropriate. Evaluation is poorly focused or absent, with few or no reasoned links to the effectiveness of altitude training in improving performance in marathon running. The answer as a whole lacks clarity and has inaccuracies. Terminology is either absent or inappropriately used.
0	0	No relevant content.

**Possible content may include:**

**AO1 – Knowledge of altitude training**

- Carried out at high altitude / over 2000m / 8000ft above sea level / usually for at least 30 days / a month.
- There is less oxygen at altitude so less oxygen available to the muscles.
- Body compensates by making more red blood cells / homeostasis.
- Oxygen carrying potential therefore increases.

**AO2 – Application to a marathon runner**

- Marathon running is an aerobic event / long duration and low intensity.
- The more red blood cells a marathon runner has, the more oxygen they will be able to deliver to the muscles.
- Their body is therefore more efficient at carrying oxygen / increase in cardio-vascular endurance.

**AO3 – Evaluation of the effectiveness of altitude training in improving performance of a marathon runner**

- Altitude training is an effective way of improving performance in the marathon as the body will have increased the oxygen carrying capacity which means the athlete will be able to run at a high intensity for longer.
- These effects will be the most significant when the athlete competes at sea level where oxygen levels are higher and the athlete is able to use all of the red blood cells to carry oxygen.
- Giving them an advantage over their competitors.
- When training at altitude, detraining can occur as training at a high intensity is difficult due to the lack of oxygen.
- Fitness may be lost.
- Altitude sickness can occur which may prevent the athlete from training therefore reducing performance.
- Psychological issues associated with training in unfamiliar surroundings / being away from home could mean they underperform.
- Other methods available that give the same results – hypoxic tents / oxygen tents / train high live low.
- Benefits can be lost relatively quickly so increased performance may only be for a short time.

**Maximum 6 marks**

<b>2</b>	<b>3</b>	<p>Athletes use knowledge of training seasons, training zones and other factors to ensure that they are in peak condition for a major event, such as the Olympic Games.</p> <p>Analyse how a 1500m runner would plan their training year before a major event.</p> <p style="text-align: right;"><b>[9 marks]</b></p>
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**Marks for this question: AO1 = 2, AO2 = 2, AO3 = 5**

Level	Marks	Description
3	7-9	Knowledge of the training seasons, training zones and other factors to optimise training effectiveness is accurate and generally well detailed. Application to a 1500m runner is mostly clear and effective. Analysis is thorough, reaching valid and well-reasoned conclusions as to the effectiveness of training seasons, training zones and other factors. The answer is generally clear, coherent and focused, with appropriate use of terminology throughout.
2	4-6	Knowledge of training seasons, training zones and other factors to optimise training effectiveness is evident. There is some appropriate and effective application to a 1500m runner, although not always balanced and presented with clarity. Any analysis is clear but reaches valid and well-reasoned conclusions for either the training seasons, training zones or other factors. The answer lacks coherence in places, although terminology is used appropriately on occasions.
1	1-3	Knowledge of training seasons, training zones and other factors to optimise training effectiveness is limited. Application to a 1500m runner is either absent or inappropriate. Analysis is poorly focused or absent, with few or no reasoned links to the effectiveness of training seasons, training zones or other factors to optimise training effectiveness. The answer as a whole lacks clarity and has inaccuracies. Terminology is either absent or inappropriately used.
0	0	No relevant content.

**Possible content may include:**

**AO1 – Knowledge of the training year**

- Runners will have various phases of training including pre-season (preparation), competition or peak season and post season (transition)
- Splitting the training year into different blocks/ phases or cycles.

**AO2 – Application to a 1500m runner**

- 1500m runners need to run at different intensities during the race therefore have to train accordingly.
- Competitive situations can be replicated in training by varying the distance, workload and intensities.

- Training methods identified to improve performance in a 1500m race these must be qualified in relation to the correct phases of the race.
- Training intensities – using different percentages of zone training (aerobic and anaerobic) along with repetitions and sets.
- They will need to do more things to aid recovery, depending on the season.

**AO3 – Analysis of how a 1500m runner would use their knowledge of training seasons to plan their training in the year before a major event. (Such as a World Championship or Olympic Games).**

- Competitive season – maintain fitness but specific high intensity training depending on the schedule of races. Aiming at quality over quantity training. Vary intensities of MHR to replicate race conditions.
- Alter distances run along with sets and repetitions.
- Building up lactate tolerances so they can delay fatigue during training and races.
- Having ice baths / massages after training and races to prevent delayed onset of muscle soreness / DOMS and enable them to maintain the level of performance in next training activity or race.
- They may use weight training as a way of increasing strength, particularly pre-season. They would determine the weights used by performing one rep max tests.
- If they want to build strength they would train with a high weight and low repetitions. About 70% of the one rep max for approximately 3 sets of 4-8 repetitions.
- If they want to work on muscular endurance they would train with low weights but high repetitions. These would be below 70% and be approximately 3 sets of 12-15 repetitions.
- Need to taper training so can peak for major races, competitions. This will involve decreasing training prior to major races to conserve energy.
- Manipulation of diet – have carbohydrates in advance of a race to give them more energy, have protein after a race / training for muscle tissue repair.
- Ensuring that they keep hydrated after a race / training to maintain level of performance / intensity, eg dehydration leads to blood thickening, which slows blood flow meaning that oxygen transport round the body slows, thus leading to a dip in performance.
- Post season / transition – active rest to maintain fitness levels. This is vital for them to remain active but equally to take a break from running full time. Runners need to remain fresh and motivated.
- The runner would need a structured training programme so that they can successfully peak for a World championships or Olympic Games.

**Maximum 9 marks**

Question	AO1	AO2	AO3	Total
1	1			1
2	1			1
3	1			1
4	1			1
5	1			1
6	1			1
7	1			1
8.1		2		2
8.2		2		2
9	2	2		4
10.1	2			2
10.2	2			2
11	1	3		4
12.1	1	1		2
12.2	1	1		2
13	2			2
14	2			2
15		1	3	4
16.1	1			1
16.2	1			1
16.3	1	1		2
16.4	1	1		2
17	5			5
18			3	3
19.1		2		2
19.2	1			1
19.3		2		2
20			5	5
21.1		2		2
21.2		2		2
22	1	2	3	6
23	2	2	5	9
<b>Total</b>	<b>33</b>	<b>26</b>	<b>19</b>	<b>78</b>